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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/604,386

07/16/2003

James C. Robinson

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24041

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10/05/2004

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EXAMINER

SAINT SURIN, JACQUES M

ART UNIT

PAPER NUMBER

2856

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/604,386	<b>Applicant(s)</b> ROBINSON ET AL.	
	<b>Examiner</b> Jacques M Saint-Surin	<b>Art Unit</b> 2856	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 July 2003 and 19 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/03/03</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 6, 8-9 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson et al. (US Patent 5,895,857).

Regarding claims 1 and 8, Robinson discloses a method for sensing and measuring stress waves (fault detection system for detecting faults of rotating elements, see: Fig. 1 and col. 5, lines 44-45), comprising :

- a) sensing stress wave motion (vibration sensor 28, see: Fig. 1 and col. 5, line 67 and col. 6, line 1) where said motion component and a vibration comprises a component (vibrations generated by target gear 36 as well as other rotating elements of the gearbox 24, see: col. 5, lines 66-67);
- b) separating said stress wave component from said vibration component with a high pass filter (high pass filter 302, see: Fig. 1 and col. 6, lines 10-11) to create a signal proportional to said stress wave; signal to create an amplified signal;
- c.) amplifying said signal to create an amplified signal (amplifier 304, see: Fig. 1 and col. 6, line 14);

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d.) processing said amplified signal with a sample and hold peak detector over a predetermined interval of time to determine peaks of said amplified signal over said predetermined period of time (the auto ranged signal is received by a high rate sampling circuit 306 and sampled at a high rate so that the signal is effectively digitized; the digitized signal is full wave rectified by digital rectifier 308 to produce a rectified signal, see: col. 6, lines 19-24);

e.) creating an output signal proportional to said determined peaks of said amplified signal (finally, the digital peak value detector 310 identifies and saves the maximum value of the signal occurring over a predetermined time interval, see: col. 6, lines 25-27). However, Robinson does not disclose or suggest repeating steps d.) and e.). Note that step (d) is directed to processing the amplified signal and step (e) to creating an output signal. It would be obvious to one of the ordinary skill in the art to repeat certain steps during the process of measuring or testing or inspecting of an object or a component because one of the ordinary skill in the art would be motivated to recognize by averaging the results obtained from the two different steps, one can ensure to derive better signal and thereby minimizing and reducing possible errors during the process.

Regarding claim 8, as disclosed above, it is a means-plus function claim that recites the means for performing the steps of the method claim 1. Therefore, it is rejected for the reasons set forth for claim 1.

Regarding claim 2, Robinson discloses the peak values are synchronously averaged at the speed of the gear 36 by data collector analyzer 26, see: col. 5, lines 57-59.

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Regarding claims 3-4 and 13, Robinson discloses because impacts representative of faults in gears are typically characterized by vibrations of about 10 KHz, a bandpass of 1,500-15,000 Hz would be selected, see: col. 8, lines 62-64. Robinson further discloses passband frequencies for the filters 44 and 46 include band widths of 50-5,000 Hz, 500-10,000 Hz, 1,500-15,000 Hz and 5,000-40,000 Hz and appropriate selections of these parameters will generally depend upon conditioning that is required of the input signal prior to rectification and sampling, see: col. 8, lines 51-58.

Regarding claims 6 and 9, Robinson discloses vibration sensor 28 which is an accelerometer.

Regarding claim 11, Robinson discloses high pass filter 304, see: Fig. 1 and col. 6, line 15.

Regarding claim 12, Robinson discloses high pass filter 304 and dual sample and peak value detector circuit 100, see: col. 9, lines 5-14.

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson et al. (US Patent 5,895,857) in view of Krent et al. (US Patent 4,776,590).

Regarding claim 5, Robinson does not specifically disclose or suggest a logarithmic amplifier. Krent discloses a logarithmic amplifier in col. 6, line 21. It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Robinson the logarithmic amplifier of Krent because the logarithmic amplifier is well known and commonly used for its high dynamic range and/or fast settling time amplitude thereby making the above combination more effective and efficient.

4. Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson et al. (US Patent 5,895,857) in view of Bseisu (US Patent 4,992,997).

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Regarding claims 7 and 10, Robinson does not disclose or suggest sensing is done with a strain gauge. Bseisu discloses accelerometers and/or strain gauges are mounted on the stem or tubing at a point near the earth's surface for sensing the torsional, axial or bending vibrations, see abstract. It would have been obvious to one having ordinary skill in the art at the time of the invention to employ the strain gauge of Bseisu in Robinson because it would sense effectively the vibrations and convert the vibratory signals to signals for receipt and recording with the signals being transmitted from the source in a an efficient manner.

### ***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Board et al. (US Patent 5,852,793) discloses a method and apparatus for predictive diagnosis of moving machine parts.

Board (US Patent 6,679,119) discloses multi-function stress wave sensor.

Yamashita (US Patent 5,734,087) discloses acceleration sensor.

Gonzalez et al. (US Patent 5,581,016) discloses aircraft-engine detonation indication system.

Rhodes et al. (US Patent 5,952,587) discloses imbedded bearing life and load monitor.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques M Saint-Surin whose telephone number is (571) 272-2206. The examiner can normally be reached on Monday-Friday.

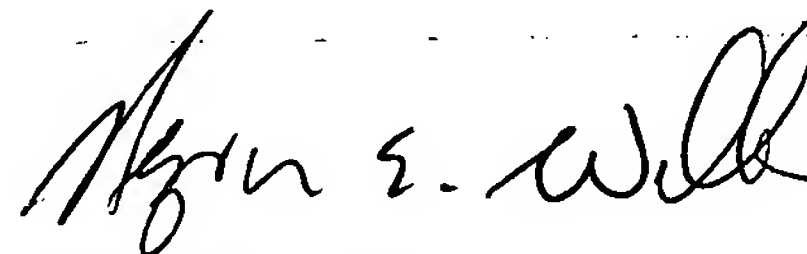
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (703) 305-4705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jacques M. Saint-Surin  
September 29, 2004



HEZRON WILLIAMS  
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